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Non-minimal Einstein-Maxwell theory: The Fresnel equation and the Petrov classification of a trace-free susceptibility tensor

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Abstract

© 2018 IOP Publishing Ltd. We construct a classification of dispersion relations for electromagnetic waves non-minimally coupled to space-time curvature, based on analysis of the susceptibility tensor which appears in the non-minimal Einstein-Maxwell theory. We classify solutions to the Fresnel equation for the model with a trace-free non-minimal susceptibility tensor according to the Petrov scheme. For all Petrov types we discuss specific features of the dispersion relations, and plot the corresponding wave surfaces.

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Keywords

dispersion relation, non-minimal coupling, Petrov type, wave surface

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